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Eric R. Schott

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/761,884	<b>Applicant(s)</b> SCHOTT, ERIC R.	
	<b>Examiner</b> DUC T. DOAN	<b>Art Unit</b> 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4, 8-14, 18-20 and 22-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-14, 18-20, and 22-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of Claims***

Claims 1-31 have been presented for examination in this application. Claims 5-7, 15-17, and 21 have been canceled. As the result, claims 1-4, 8-14, 18-20, and 22-31 are pending in this application.

Claims 1-4, 8-14, 18-20, and 22-31 are rejected

The applicant's remarks and amendments filed 5/20/2008 have been considered with the results as follows,

### ***Specification Objections***

Specification's page 1 lines 7-11, claims priority to the US provisional Application No 60/441810. However, the previous office action dated 3/14/2007, section priority, pointed out that there is no adequate support or enable in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this applications. Thus the claims in the instant application are not entitled to the benefit of the prior US provisional 60/441810.

Correction(s) are required.

### ***Claim Objections***

Claims 28-31 are objected to because:

The recitation "the system of claim 11" lacks antecedent basis. In this instant, claim 11 directs to a performance process.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by other's in this country or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-4, 8-14, 18, and 22-31 are rejected under 35 U.S.C. 102 (e) as being anticipated by Dimitri (US 6839802).

As in claim 1, Dimitri discloses a system for providing differentiated classes of storage,  
comprising a storage device having a plurality of storage locations and a logical block name

space for organizing logical block names of the storage locations (Fig 3, storage device, 20a to 20m, logical block name space with LBA as shown in Fig 1, col. 1 lines 9-42), a performance process configured to determine a level of performance for the plurality of

storage locations (Fig 4, logic for determine level of performance for storage locations) and partition the plurality of storage locations into a plurality of regions as determined by their different levels of performance (Fig 4, partition into zones), and a mapping process configured to map the partitioned regions of the storage locations and aggregating the logical block names of the storage locations in the partitioned regions having an identical level of performance to a selected section of the logical block name space (Fig 4, mapping partitioned regions/zones to groups/sections of logical blocks having identical performance level, aggregating logical block names LBAs to RAID stripes/sections, col. 8 lines 31-43) , thereby providing differentiated classes of storage to one or more clients accessing the system (Fig 4, col. 8 lines 31-43, thereby providing different classes of storage to users, col. 9 line 62 to col. 10 line 9).

As in claim 2, Dimitri further discloses the performance process separates the plurality of storage locations into a plurality of categories as determined by their different levels of performance (Fig 4).

As in claim 3, Dimitri further discloses the different levels of performance represent different RAID levels of performance (Fig 3 and 4, col. 8 lines 31-43).

As in claim 4, Dimitri further discloses the aggregated logical block names correspond to a common RAID level (Fig 3 and 4, col. 8 lines 31-43).

As in claim 8, Dimitri further discloses a process configured to employ the storage to provide a file system service (col. 9 line 62 to col. 10 line 9).

As in claim 9, Dimitri further discloses a process configured to provide a storage volume service (col. 9 line 62 to col. 10 line 9, provide volumes in disks to store computer data/data in files).

As in claim 10, Dimitri further discloses the mapping process creates multiple storage volumes at a selected level of performance (col. 9 line 62 to col. 10 line 9, provide volumes in disks to store computer data for example data in files. Fig 3 and 4, col. 8 lines 31-43 grouping to volumes at a selected level of performance).

As in claim 11, Dimitri discloses a performance process for providing differentiated classes of storage, based on determined levels of a plurality of storage locations if a storage device, the process comprising the steps of providing a storage device having a plurality of storage locations and a logical block name space for organizing logical block names of the storage locations (Fig 4),

determining a level of performance of the plurality of storage locations (level of performance for storage locations are determined with values shown in Fig 4), partitioning the plurality of storage locations into a plurality of regions as determined by their different levels of performance (Fig 4, partitioning into zones), mapping partitioned regions of the storage locations (Fig 4, zones ready to be used to store data in volumes), and aggregating the logical block names of the storage locations in the partitioned regions having an identical level of performance to a selected section of the logical block name space (Fig 4, mapping partitioned regions/zones to groups/sections

of logical blocks having identical performance level, aggregating logical block names LBAs to RAID stripes/sections, col. 8 lines 31-43), thereby providing differentiated classes of storage to one or more clients accessing the system (Fig 4, col. 8 lines 31-43, thereby providing different classes of storage to users, col. 9 line 62 to col. 10 line 9).

Claim 12 is rejected based on the same reasons as of claim 2.

Claim 13 is rejected based on the same reasons as of claim 3.

Claim 14 is rejected based on the same reasons as of claim 4.

Claim 18 is rejected based on the same reasons as of claim 10.

As in claim 22, Dimitri further discloses a level of performance includes a data access time, or a reliability of a storage location, or a combination thereof (Fig 3 and 4, zones with different data accessing time, storage locations with RAID providing different level of performance/reliability).

As in claim 23, Dimitri further discloses the storage device is a single storage disk.

As in claims 24 Dimitri further discloses the mapping process performs mapping and aggregating when the storage system is designed (col. 9 lines 62 to col. 10 line 9, storage system is designed to map/store database applications' files to outer zones of disks)

As in claim 25, Dimitri further discloses the mapping process performs mapping and aggregating during operation of the storage device (col. 9 lines 10-15, migrating more frequently accessed files to outer zones of disks).

As in claim 26, Dimitri further discloses a performance measurement system for scanning storage locations of the storage device and determine the level of performance for the storage (Dimitri's Fig 4, scanning storage locations across the disk surface and measure the performance levels as shown in Fig 4).

As in claim 27, Dimitri further discloses the performance measurement system performs experimental read and write operations and determines the level of performance from experimental data collected in the read and write operations (Dimitri discloses the logic to measure performance levels/ utilization factor based on number of read and write operations to accessing files, collected during a measured time period; Based on the history of the this collected information, files are categorized accordingly, see Dimitri's col. 6 lines 7-10).

Claim 28 is rejected based on the same reasons as of claim 22.

Claim 29 is rejected based on the same reasons as of claim 27.

Claim 30 is rejected based on the same reasons as of claim 24.

Claim 31 is rejected based on the same reasons as of claim 25.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made



to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dimitri (US 6839802) in view of Nguyen et al (US 6690523).

As in claim 19, Dimitri discloses a system for providing differentiated classes of storage, comprising a storage device having a plurality of storage locations, a logical block name space for organizing logical block names of the storage locations (Fig 3, storage device, 20a to 20m, logical block name space with LBA as shown in Fig 1, col. 1 lines 9-42), and performance parameters of the storage locations that vary across the storage device (different zones across the storage device having different performance parameters),

a partitioning process configured to partition the storage locations into regions (partitions into zones) and aggregate the logical block names of the storage locations in the partitioned regions having an identical level of performance to a selected section of the logical block name space (Fig 4, mapping partitioned regions/zones to groups/sections of logical blocks having identical performance level, aggregating logical block names LBAs to RAID stripes/sections, col. 8 lines 31-43), thereby providing differentiated classes of storage to one or more clients accessing the system (Fig 4, col. 8 lines 31-43, thereby providing different classes of storage to users, col. 9 line 62 to col. 10 line 9), Dimitri does not expressly disclose the claim's aspect of a performance

measurement system. However, Nguyen discloses a performance measurement system that scans storage locations of the storage device and determines the level of performance of the storage locations (col. 6 lines 15-40, calibration scan of the entire disk to recalibration each and every zones periodically). It would have been obvious to one of ordinary skill in the art at the time of invention to include calibration method as suggested by Nguyen in Dimitri's system such that the different performances of each zones can dynamically be determined and thereby further optimize the performance of the system (Nguyen's col. 1 lines 22-41).

As in claim 20, Dimitri further discloses a system according to claim 19, wherein the partitioning process selects a fixed set of partitions as a function of a selected configuration of system components (Fig 3 selecting zones as a function of a selected configuration of system's files col. 6 lines 7 to 26).

### ***Response to Arguments***

Applicant's arguments in response to the last office action has been fully considered but they are not persuasive. Examiner respectfully traverses Applicant's arguments for the following reasons:

A) Applicant's argument regarding the Specification Objections is not persuasive. Applicant provides page 16/26 of the Appendix (EQLC-PXX-005) and Figs. 5 and 6 of the Appendix as evident of the teaching of the U.S. Provisional Application No. 60/441810.

In response, It is noted that the handwritten "EQLC-PXX-005" does not match the document number of the copy that was on the record of the U.S. Provisional Application No. 60/441810 (i.e Attorney Docket No. EQLC-P60-003). Moreover, the content of page 16 of the record does not match at all to the page 16/26 of the Appendix. Therefore, the Specification Objection is maintained.

B) Applicant argues, " The Examiner was of the opinion that Dimitri (at Fig. 4, Column 8, lines 31-43) teaches the feature of "thereby providing differentiated classes of storage to one or more clients accessing the system" as required in Applicant's Claim 1. Applicant respectfully disagrees. Although Dimitri refers to a RAID system, nowhere in the cited reference discusses

"providing differentiated classes of storage to one or more clients" that results from aggregating logical block names (LBNs) of storage regions having identical level of performance to a selected section of the LBN space. Referring to Fig. 4 and Column 8, lines 18-43, discusses a prior art problem of zone formatting. Specifically, zone constant angular velocity (ZCAV) formatted disks in RAID arrays. **ZCAV has to do with the predetermined geometry of a disk and not necessarily its measured performance..**" Examiner disagrees.

In response, Dimtri's Fig 1, 3 lines 9-42 teaches logical block name space with LBA. Dimtri teaches disks are organized to zones. Each zone has difference performance numbers as shown in Figs 4 and 5. The performance numbers in Figs 4 and 5 are measured numbers for corresponding zones of the storage devices.

Applicant further argues by quoting Dimitri's col. 8 lines 21 to 42 and asserting "In contrast, Applicant's invention is related to providing differentiated classes of storage to one or more clients accessing the system. As discussed above, clients accessing the system can utilize the storage pool with the appropriate performance level needed to carry out the desired class of service (See, e.g., Specification page 11, lines 5-8). For example, one client may utilize a RAID 10 service, and another may utilize a RAID 5 service (See, e.g., Specification page 9, line 22 to page 10, line 2). In the process of setting up the system, the storage system administrator can determine which of the performance LBN subspaces should be used to support a particular one of the RAID levels. For example, if Region A is the region of the drives that has particularly good random access I/O performance, it will often be appropriate to allocate it to a RAID-10 set since RAID-10 is also characterized by good random access performance, especially random write performance; the characteristics of the two layers thus reinforce each other resulting in a "Pool A" that has excellent random write performance. (See,

Specification

page 10, lines 3-10). Dimitri has nothing to do with providing differentiated classes of storage as

a service to one or more clients accessing the system in response to observed performance levels.

Rather Dimitri is solving the prior art problem that has to do with ZCAV formatted disks in

RAID arrays. Moreover, the Examiner was of the opinion that Dimitri teaches the feature of

"determine[ing] a level of performance for the plurality of storage locations and partition[ing]

the plurality of storage locations into a plurality of regions as determined by their different levels

of performance" as required in Applicant's Claim 1. Applicant respectfully disagrees.

Dimitri

does not determine any level of performance on the storage disk. Rather Dimitri initially ..."

In response, Dimitri's col. 8 lines 21 to 42 teach that different zones have different performances numbers (i.e different class of storages). Certain RAID systems that require high performance could use zones of outer edges that have higher performance number. Additionally Dimitry further teaches that when several storage devices are being accessed in parallel stripping (typically in a RAID system), the zones

of these storage devices should have similar performance numbers therefore further eliminating the slow down of the slowest performing drive/zone in the stripe/group. Of course, for other applications/users that do not require high performance, they should use another different storage class provided with different storage zones.

Thus Dimitri clearly teaches "determine a level of performance for the plurality of storage locations and partition the plurality of storage locations into a plurality of regions as determined by their different levels of performance".

Applicant further argues "...Perhaps a practical example would further emphasize the differences between the approach of Dimitri and the Applicants - and the advantages of the latter. Consider a storage system using two different disk drives, each having relatively different performance. A first drive has a relatively faster access time than a second drive. Dimitri's zone-based approach would always group the inner zones of each drive in a RAID array, and group their outer zones together, based on their physical location. However, with Applicants' approach, performance would be first measured, **and the inner regions of the slower disk would be grouped with the outer regions of the faster disk..**".

In response, it's noted that the limitation/requirement of "the inner regions of the slower disk would be group with the outer region of the faster disk" is not recited in the claim. If Applicant believe that the above limitation/requirement would overcome Dimitri's teaching, the claim must be furthered amended to include the above limitation/requirement, providing that the limitation is clearly supported in the specification.

C) For the remaining claims,

With regard to 2-4,8-10 and 22-27, Applicant offers the same arguments as of claim 1, and the same responses apply.

With regard to claims 11 and 19, Applicant offers the same arguments as of claim 1, and the same responses apply.

With regard to claims 12-14,18 and 28-31, Applicant offers the same arguments as of claim 1, and the same responses apply

With regard to claim 20, Applicant offers the same arguments as of claim 1, and the same responses apply

As such, these arguments are found to be not persuasive.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

When responding to the office action, Applicant is advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The examiner can normally be reached on M-F 8:00 AM 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung S. Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Hyung S Sough/  
Supervisory Patent Examiner, Art Unit 2188  
08/05/08